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GEOLOGIC APPLICATION
OF THERMAL INERTIA IMAGING

USING HCMM DATA

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Introduction

The JPL/HCMM Investigation is a study of the feasibility of using thermal inertia, inferred from remotely sensed temperature data, to complement Landsat reflectivity data for reconnaissance geologic mapping and mineral exploration.

During the October-December 1979 quarter of this investigation a field measurement program using the JPL Thermal Inertia Meter (TIM) was conducted at the JPL test sites in Western Nevada and California. Measurements taken of various rock and soil types indicate that the TIM is continuing to perform to expectations. A series of meteorological measurements, taken during NS-001 aircraft coverage of one of the sites, was also obtained.

Sufficient quantities of HCMM images were received to allow the selection and ordering of part of the satellite data tapes needed for processing.

A numerical model for use in conjunction with TIM measurements to calculate surface thermal inertia is being developed.

Problems

None

Accomplishments

A detailed field measurement program employing the recently developed JPL Thermal Inertia Meter (TIM) was conducted during this reporting period (December 2-7, 1979). This program included a series of meteorological measurements coincident with NS-001 aircraft coverage by the NASA C-130 of site 378 in Western Nevada on December 6, 1979. Subsurface probe temperatures were measured, soil moisture samples collected, two MRI Weather Stations were set up and PRT-5 ground temperature readings were taken at one of the sites during the aircraft overflight.

Approximately thirty measurements were taken with the TIM over a variety of rock and soil types at the Pisgah Crater, California and Walker Lane,

Nevada test sites. Materials measured included quartzite, andesite, sandy alluvium, pahoehoe and aa basalt fragments and outcrop, and clay-silt playa. Results indicate the device is continuing to perform to expectations, yielding reproducible and accurate readings of thermal inertia.

Work also continued during this quarter on a numerical model to be used in conjunction with the TIM measurements to calculate surface thermal inertia.

Sufficiently large quantities of satellite image products have been received from GSFC to select and order part of the appropriate satellite data tapes (cloud-free coverage of JPL test sites coincident with field trips) needed for processing.

Significant Results

None

Presentations

None

Program for the Next Reporting Interval

Selection and ordering of appropriate satellite data tapes will continue as more HCMM photographic images are received. Preliminary processing and analysis of the satellite tapes will begin immediately upon their receipt. The newly obtained ground truth data will be analyzed.

Recommendations

None

Funds Expended

Expenditures for October-December, 1979:

\$9410.00

Conclusions

None